2MASS-IRAS Discovery of New Candidate Vega-type Systems

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We present results of a survey for circumstellar dust in main-sequence stars, utilizing the Two Micron All-Sky Survey (2MASS), IRAS Faint Source Catalog (FSC) and Serendipitous Survey Catalog (SSC). We searched for IRAS excess 12 μm emission with respect to 2MASS J, H, and K_s photospheric emission. These excesses probably arise from dust at "terrestrial material" temperatures, $\sim$ 200–500 K, located at $\sim$ 1-10 AU from the stars. We observed a subset of the excess-emitting stars with the MIRLIN camera at the 200-inch Hale telescope at Palomar Observatory, and with the OSCIR camera at the 8.2-m Gemini North telescope (as part of the QuickStart program). We observed with the N (10.8 μm) broadband filter, and the 8–13 μm "silicate" filters. The objective was to confirm that circumstellar dust is the origin of the 12 μm excesses, as opposed to background neighboring sources in the large IRAS beam. We found that several of the candidate systems had photospheric flux densities at 10 μm. However, we possibly confirmed circumstellar excess 10 μm emission from HIP 21377 (A1m V) and SAO 42588 (G5 V), among others. We comment on the possibility of silicate emission from these sources. Colder dust, more distant from the stars, might also exist in Kuiper Belt-like regions in some of these systems. We are pursuing 20 μm ground-based observations, and we comment on the likelihood of spatially resolving these systems with current ground-based imaging technology. A fuller understanding of this dust may require more sensitive observations at long wavelengths by SIRTF.

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